

Energy Future System Operator Consultation: National Grid's response to BEIS & Ofgem

September 2021

Executive Summary

National Grid sits at the heart of Britain's energy system, connecting millions of people and businesses to the energy they use every day. We have engaged with BEIS and Ofgem on their proposal for a Future System Operator and welcome the opportunity to respond to this consultation. It is critical that the right governance, policy and regulatory frameworks are in place to drive coordinated delivery of net zero investment for the benefit of the economy, environment and consumers.

Energy system governance must evolve to meet the challenges and opportunities of achieving net zero

Transforming our energy system will be a critical part of the UK's transition to a net zero economy, providing the opportunity to unlock hundreds and thousands of skilled jobs right across the country. While significant progress has already been made in this transition, there is much further to go, requiring a step change in innovation and investment.

Achieving the required scale and pace of investment at the lowest cost to consumers, while maintaining security of supply, will require a different mindset and approach from Government, the regulator and industry, which must be supported by an effective governance structure. The energy system today, its governance and regulatory framework, is siloed and not designed to deliver against an increasingly complex decarbonisation challenge with uncertain technology pathways. Importantly, the unclear boundaries across the energy supply chain and between different fuel types, as well as the need to foster new technology solutions, means that a whole system approach is needed to set ourselves up for success in the decades to come.

A Future System Operator is, in principle, a positive first step towards an improved governance framework

A Future System Operator (FSO), which is properly resourced and empowered, has the potential to cut through some of the uncertainty of the clean energy transition. Specifically, National Grid believes that:

- **There is value in an FSO which can support whole energy system strategic planning.** Currently, there is no single body within the energy system which has overall accountability for providing a holistic and strategic view of how markets and infrastructure should develop to meet our net zero goal in the most efficient way. An FSO could potentially plug this gap, ensuring coordinated and long-term advice, decision-making and strategic planning across gas and electricity systems, including identifying where investment ahead of need is required to deliver value for money for consumers.
- **An FSO can build upon the skills and capabilities of the Electricity System Operator.** National Grid Electricity System Operator (ESO) has some of the capabilities and technical knowledge that will be required in a potential FSO and could therefore provide the foundations upon which such an organisation might be built. As set out above, the greatest system need is in longer-term planning, therefore we are agnostic about whether an FSO should carry out the real-time balancing function that is currently undertaken by the ESO.
- **An FSO should not take on the operational functions of the Gas System Operator.** We welcome the consultation's recognition of the differences between electricity and gas system operation, and agree that there is currently no case for an FSO to undertake operational functions in the gas system, which should remain with the Gas System Operator (GSO) as part of National Grid Gas (NGG). Retaining an integrated Transmission System Operator model for gas is critical from a safety and security of supply perspective. We agree that there is merit, as set out in the consultation's preferred option, in an FSO carrying out strategic planning and long-term forecasting functions for gas, which can support a whole system view.

However, it is important to note that the preferred option does include some gas functions that, if implemented as proposed, would result in the need for capabilities to be retained and specific activities to be duplicated within NGG to allow it to continue to conduct its regulatory obligations and effectively engage as a market participant.

- **New capabilities and functions will need to be developed as part of a future focused FSO.** As well as building on existing system capabilities, new skills and functions will be needed to ensure an FSO can support the development of new technologies and markets. For example, an FSO would need to rapidly build the capability to understand hydrogen, which is likely to play a key part of the future energy system. It is important to ensure that the skills and capabilities are in place ahead of giving any new, or enhanced, roles or duties to an FSO. Furthermore, broader capabilities and skillsets could be drawn from wider industry, Government, or potentially Ofgem, and should be considered in the design of a potential FSO.
- **An FSO will not be a silver bullet, and wider reform will still be needed.** It is important to note that while an FSO can add value, it cannot resolve all issues with the current system governance. As such, wider reform will still be needed, including improved coordination across Government departments; collaboration across national, regional and local authorities; planning and management of the skills pipeline; supply chain coordination and management; and public engagement on the net zero transition.

An FSO should be independent, durable and with clarity of roles, responsibilities and accountabilities

How an FSO is set up will have a significant impact on its ability to fulfil its role effectively and achieve the right outcomes for the economy, the environment and consumers. As such, we believe that:

- **An independent FSO which is established by statute could engender confidence across the system.** There are high levels of checks and balances under the existing system operation ownership model which have ensured that no potential conflicts of interest have been acted upon, as recognised by the consultation. However, we recognise that a more independent FSO, with enhanced roles and responsibilities, may be better placed to make decisions on required network capability and market development at pace. Furthermore, an FSO will need stability and durability in its role, with appropriate powers which should be defined in legislation.
- **Both public and private ownership models are viable options.** We agree that the two options outlined in the consultation – a privately owned model and a publicly owned model – are the right ones to consider. For a private sector model, ensuring the right incentivisation and regulation will be critical, and there is a question over the possibility of removing all potential for conflicts of interest under this option. Incentivisation in a public sector model is less clear, and particular thought would need to be given to talent retention and attraction given the different career prospects associated with this model. However, a public sector model may be more suited to facilitating a holistic, strategic focus on the policy goals and requirements for the UK's net zero transition.
- **Clarity of roles, responsibilities and accountabilities between an FSO, Ofgem and BEIS will be critical.** In establishing an FSO, clarity on roles and interfaces with other institutions will be essential to avoid inefficiencies, overlaps and conflicts. This will in part depend on the ownership model of an FSO, which would impact Ofgem's remit; for example, we would expect Ofgem's regulation of FSO decisions to be more limited under a public sector model. At a broader level, a Strategic Policy Statement from BEIS could help to align the FSO's and Ofgem's objectives to the Government's policy direction. While particular attention will need to be given to an FSO's interactions with BEIS and Ofgem, the consultation rightly identifies the need to consider interfaces with a wider range of organisations and groups. We therefore consider that there may be merit in convening a group of industry leaders, representative of the diverse range of interests, to provide advice to BEIS on the detail of the roles, responsibilities and interfaces required.

A collaborative approach must be taken towards implementation to minimise transition risks

Implementing a system change of this significance will take time and has the potential to create both operational disruptions as well as strategic risks (e.g. key skills retention and attraction) if not managed correctly. The consultation rightly recognises that the assets and functions that would form an FSO under the proposals are currently owned by National Grid, requiring a sale process to take place. Once a decision on the future governance arrangements is taken by Government, it is therefore important that National Grid, BEIS

and Ofgem work collaboratively to design, develop, and implement a transition programme that manages the divestment of any assets in a coordinated and efficient way to minimise risk.

As part of this, further analysis will be needed to understand the full costs and benefits of an FSO. National Grid has not contributed to the Impact Assessment which underpins the proposals, and we believe that the cost assumptions for fully separating the ESO from National Grid do not fully reflect the cost drivers and will need to be updated.

National Grid recognises that the future of energy system governance is ultimately a decision for Government. We look forward to continued collaboration with BEIS and Ofgem in developing the proposals for the transition to a Future System Operator, which is consistent with our responsibilities to consumers, stakeholders and shareholders.

About National Grid

National Grid Group's operations in the UK include: National Grid Electricity Transmission (NGET), which owns the high voltage transmission system in England and Wales; Western Power Distribution (WPD), which owns and operates electricity distribution networks in the Midlands, the South West and Wales; National Grid Gas (NGG), which owns and operates the high pressure gas transmission system in England, Scotland and Wales; National Grid Ventures (NGV), which owns and operates energy businesses in competitive markets, including electricity interconnectors and the Grain LNG storage terminal; and National Grid Electricity System Operator (NGESO), a legally separate business within National Grid Group which balances the supply and demand of electricity in real time across Great Britain.

This consultation response represents the view of National Grid Group. As a legally separate business, National Grid ESO has submitted a separate consultation response. In this instance WPD has also submitted a separate response as the consultation period has coincided with a hold separate order placed on National Grid and WPD by the Competition Markets Authority (CMA) following the completion of the acquisition of WPD by National Grid in June 2021. The hold separate order was lifted by the CMA in August 2021.

Full response to consultation questions

Introduction

In framing its response, National Grid recognises BEIS' policy goals and commitment to a separate Future System Operator (FSO). National Grid is committed to supporting consumers' and net zero needs. We intend to advance these in a manner which supports the Government's net zero goals, consumer and employee interests, and which recognises our responsibility, as the existing Electricity System Operator (ESO) and Gas System Operator (GSO) owner, to our shareholders.

Case for change

1. Do you agree that net zero will create the need for new technical roles in the electricity and gas systems, and require a new approach to energy system governance?

Yes. Technical roles in electricity and gas systems and energy system governance must evolve to meet the challenges and opportunities of achieving net zero.

Transforming our energy system will be a critical part of the UK's transition to a net zero economy. Achieving the required scale and pace of investment at the lowest cost to consumers, while maintaining security of supply, will require a different mindset and approach from Government, the regulator and industry, which must be supported by an effective governance structure. Much of the energy system today, alongside its governance and regulatory framework, is built around a set of siloes, and is not currently designed to deliver against an increasingly complex decarbonisation challenge with uncertain technology pathways.

Effective and efficient delivery of net zero will require strategic whole system planning, network coordination and investment across energy vectors (electricity, gas, hydrogen, biomethane, CCUS etc.) and across different parts of the energy system (generation, transmission, distribution, storage and non-asset solutions).

New technical roles in the electricity and gas systems, incorporated into this whole system approach, with effective strategic planning and co-ordination, can help to set the UK's energy system up for success in the decades to come.

2. Do you agree that the establishment of a Future System Operator is needed to fulfil the kinds of technical roles needed to drive net zero?

In principle National Grid is supportive of an FSO approach. Currently, there is no single body within the energy system which has overall accountability for providing a holistic and strategic view of how markets and infrastructure should develop to meet our net zero goal in the most efficient way. An FSO could potentially plug this gap in existing accountabilities by ensuring coordinated and long-term advice, strategic decision-making and planning across gas and electricity systems, including identifying where investment ahead of need is required to deliver value for money for consumers. To minimise inefficiency and duplication, roles and responsibilities will need to be clearly defined, with an FSO focusing on strategic whole system issues and others, such as asset owners, remaining best placed to undertake technical roles such as system specific detailed engineering and optioneering.

3. Do you agree that a Future System Operator should have roles in both the electricity and gas systems?

Yes. We agree that a Future System Operator should have roles in both electricity and gas (natural and hydrogen) and other emerging sectors such as CCUS, to ensure effective whole system strategic planning.

We welcome the consultation's recognition of the differences between electricity and gas system operation, and agree that there is currently no case for an FSO to undertake operational functions in the gas system, which should remain with the GSO as part of National Grid Gas (NGG). Retaining an integrated Transmission System Operator model for gas is critical from a safety and security of supply perspective. We agree that

there is merit, as set out in the consultation's preferred option, in an FSO carrying out certain strategic network planning and long-term forecasting functions for gas, which can support a whole system view.

Therefore, the role of any FSO should vary between gas and electricity, with the role for gas being limited and excluding operational functions. Please refer to our responses to questions 9 and 10 below for further information.

4. Do you agree that a Future System Operator should be entirely separate from National Grid plc?

We have been engaging with BEIS and Ofgem on operational models for a number of years and we supported the legal separation of the ESO in 2019. As recognised by the consultation, there are high levels of checks and balances under the existing system operation ownership model which have ensured that no perceived or real conflicts of interest have been acted upon.

However, we recognise that ownership models are ultimately a decision for government, and that an independent FSO, with enhanced roles and responsibilities, and unconstrained by perceived or potential conflicts of interest, may be better placed to make decisions on required long-term strategic network capability and market development at pace whilst engendering confidence across the system.

It will be important that any new body is set up for success, with clear roles, responsibilities and accountabilities and resourced by people with the right skills and capabilities to ensure efficient and effective delivery. We will continue to work with BEIS and Ofgem on this. While particular attention will need to be given to an FSO's interactions with BEIS and Ofgem, the consultation rightly identifies the need to consider interfaces with a wider range of organisations and groups. We therefore consider that there may be merit in convening a group of industry leaders, representative of the diverse range of interests, to provide advice to BEIS on the detail on the roles, responsibilities (including appropriate prioritisation of deliverables) and interfaces required.

5. What issues are there with existing institutional arrangements in the UK energy system in relation to system-wide decision-making and planning?

Existing market participants have limits on their powers, and existing institutional arrangements could be improved on to provide clear accountability and responsibility for system-wide decision making and strategic planning. There is currently no single entity empowered to lead and bring together detailed net zero transition planning and also to provide strategic policy advice to government, to analyse and identify infrastructure requirements or to facilitate effective market reform and development. This can result in investment uncertainty, delayed decision making and impact efficient and effective system-wide decision making and planning.

The scale of the challenge to meet net zero requires a further change of mindset and approach from Government, Ofgem and industry. Significant investment will continue to be required in the UK's energy infrastructure, but this will take place in a rapidly evolving system which is becoming more decarbonised, decentralised and digitalised. This is a challenging transition, which is happening at real pace. Effective net zero governance and institutional arrangements will be essential.

To achieve Government's net zero ambitions, the current system of net zero governance must be reformed with clear roles, responsibilities and accountabilities established for all parties:

- Government needs to provide clarity on net zero ambition, strategy, policy and business models to stimulate timely investment. They must also collaborate across a range of industry stakeholders to ensure effective alignment with the regulatory framework and net zero delivery.
- Ofgem's role, responsibilities and duties will need to evolve as part of a wider reform of energy governance, with greater clarity and alignment required across different organisations and processes. We believe that strengthening Ofgem's statutory duties to specifically support the delivery of the UK's emissions reduction targets would help to ensure net zero receives sufficient focus, and enable Ofgem to better balance its objectives to serve the needs of current and future consumers. In addition, a Strategic Policy Statement from BEIS could help to align an FSO's and Ofgem's objectives to the Government's policy direction.

- An FSO, if properly resourced and empowered, could improve coordination to ensure the most appropriate pathways are identified, and investments are made; both to reach net zero and to identify where investment ahead of need is required to deliver value for money for consumers.

For example, there is a particular issue today with system-wide decision making and planning under uncertainty. Ofgem typically requires certainty before approving investment. In RII0-T2 this has resulted in a higher reliance on Uncertainty Mechanisms, enabling £10bn or more of additional funding (above baseline funding) to allow companies to bring forward strategic network investment during the price control to help meet net zero. This includes investment needed to support offshore wind connections in line with the Government's target for 40GW by 2030 and investment to support future hydrogen networks. A properly resourced and empowered FSO would be able to cut through some of this uncertainty by taking a system-wide view, for example, by considering lower total cost solutions to transmission reinforcement for wind against various scenarios for build over the next one to two decades, and by understanding what hydrogen infrastructure is most likely to be required and proactively planning for it so that conversion and/or additional build can be significantly hastened once sufficient certainty materialises.

It is important to note that while an FSO can add value and help resolve some of the issues associated with existing institutional governance, it cannot resolve all the issues and should therefore be part of wider reform which considers cross-sector coordination, regulation, markets, public engagement, the skills pipeline and supply chain.

6. What examples/case studies are you aware of where net zero delivery in one part of the energy system did not adequately account for cross-system impacts or costs?

The regulatory framework for energy network infrastructure has traditionally been designed around being responsive to customer connection requests. This reactive approach historically worked well but given the scale and pace of change has more recently created issues where insufficient time is left to create the optimal solution for investment.

For example, there would have been benefits in earlier clarity on funding and accountabilities to enable work on North Sea coordination, planning of an offshore grid and the associated onshore connections to commence earlier. We welcome the Offshore Transmission Network Review (OTNR) which is now driving collaboration in the design and delivery of the offshore transmission network, and the ongoing development of the onshore Holistic Network Design, which should provide a clear 'blueprint' for network investment over the longer-term. It is important that this is endorsed by both Government and Ofgem. We hope this will provide earlier certainty of need and confirmation that the optimal options have been selected much earlier, to drive timely, co-ordinated investment.

7. Where should government focus in our efforts to improve systems thinking and coordination across the energy system?

Effort should be focused on improving whole system strategic planning that considers all vectors. There is a need for new processes and systems for taking decisions where there is some uncertainty, accounting for the opportunity cost of delay, as well as the costs of potentially making the wrong decision. In most cases, if uncertainty is properly modelled and accounted for then the right cross system actions will become clear. Sometimes this will be to wait until further information is available, sometimes it will be to act in the knowledge that a timely decision, based on current information may be better than delaying until all the facts are known. Such timely decisions provide market confidence, support delivery of government targets, and avoid costs associated with longer delivery timescales. In many cases better handling of uncertainty will help to resolve 'whole system challenges', e.g. planning for different mixes of low carbon generation to 2050.

There is also a need to develop approaches for whole system challenges where new thinking is required. Some of these (e.g. decarbonisation of heat) will have no 'right' answer and will require Government to make evidence based policy decisions in a timely way; others (e.g. planning for hybrid hydrogen/electrical systems) will require new thinking and ways of working.

In terms of wider reform across sectors (beyond the energy systems, including transport and industry) we welcome the recognition in the Energy White Paper that industry governance and architecture must change in

order to deliver net zero efficiently, effectively and at speed. To date, multiple departments across Whitehall have been tasked with reviewing siloed elements of the net zero transition. However, the transition touches upon all aspects of the economy, with increasingly blurred lines between different sectors, requiring a more holistic governance approach.

We recognise that there have been recent examples of positive cross-Whitehall working which include the work of the Office for Zero Emissions Vehicles (OZEV, part of the Department for Transport and BEIS) and the Offshore Transmission Network Review (OTNR, led by BEIS but including Defra, The Ministry of Housing Communities and Local Government, The Crown Estate, The Welsh Government and Ofgem amongst others) which is driving collaboration in the design and delivery of the offshore transmission network, consistent with the ambition to deliver net zero. This type of co-ordination and collaboration between stakeholders ensures knowledge is shared, issues are identified early, and proposals developed which work across regions and sectors.

However, we believe coordination could be further improved across Whitehall, with the devolved administrations and local and regional authorities. This improvement is required on both specific issues (e.g. the full life cycle of hydrogen infrastructure production, storage and distribution and the decarbonisation of heat which will require close co-ordination between central, regional and local government as well as industry given the location specific nature of heat decarbonisation solutions) and broader net zero delivery through more effective governance.

What should an FSO do

8. Do you agree that the FSO should undertake all the existing roles and functions of NGESO? If not, please explain why.

We agree that NGESO has some of the capabilities and technical knowledge that will be required in an FSO and could therefore provide the foundations upon which such an organisation might be built. The greatest system need is in longer-term strategic whole-system planning, therefore we are agnostic about whether an FSO should carry out the real-time balancing function that is currently undertaken by the ESO. If this function is included, further consideration should be given to ensure effective incentivisation of an FSO's real-time electricity balancing actions (included in the proposed function), to prevent any conflicts or tension between short term and long-term objectives and to achieve the right risk / reward balance for consumers.

However, the roles and functions of NGESO should not be considered in isolation. The transfer of additional capabilities and technical knowledge from other organisations, such as BEIS, Ofgem and industry to ensure the right balance of skills and experience across all vectors and across the new and enhanced elements of an FSO's proposed role, as well as the development of new skills and capabilities that are not currently in the market, should also be considered in early design considerations. Parity of skills, knowledge, experience and capability across vectors will also be important to ensure a balanced, non-biased view between fuel types.

9. Do you agree there is a case for the FSO to undertake the long-term strategic functions outlined in Option 1? Please elaborate and provide any views on the functions we have outlined in Option 1.

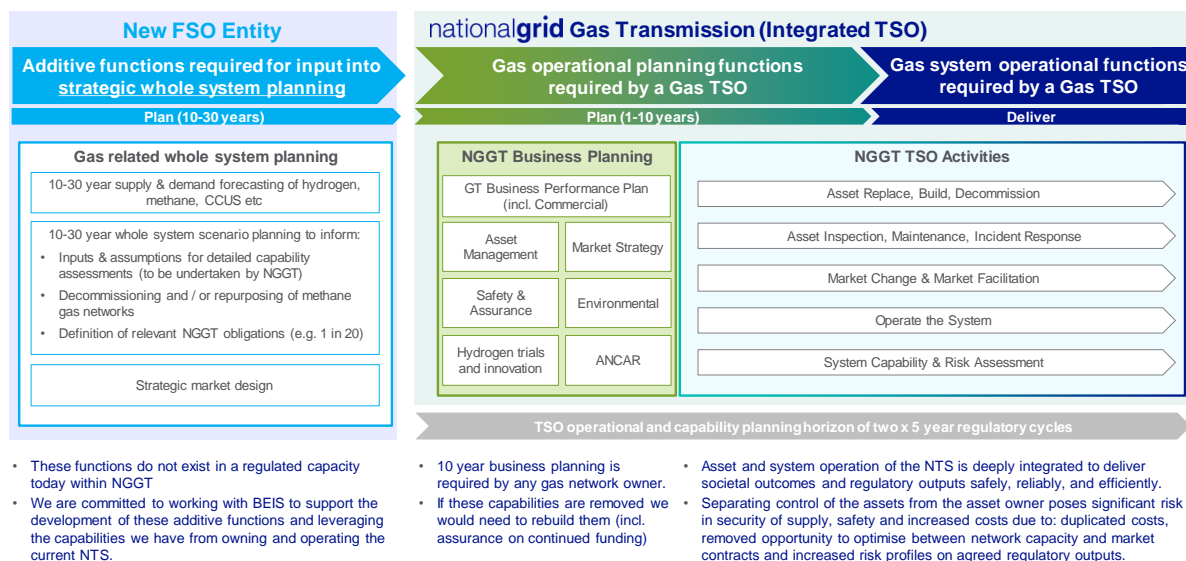
We agree that there is merit, as set out in the consultation's preferred option (Option 1), in an FSO carrying out long term strategic planning and long-term forecasting functions for gas, which can support a whole system view subject to ensuring that the network planning activities are strategic rather than operational. Further detail on our view of each element of the option is set out below.

Strategic Network Planning

Strategic network planning should be defined as setting the direction and vision for how future energy infrastructure supports the transition to net zero at a national and regional level. This should be based on industry consultation and whole energy system planning, with close collaboration between all network owners (electricity, gas, hydrogen, carbon) at both the distribution and transmission level.

The diagram below illustrates the additive activities that we believe an FSO could undertake in the context of strategic, whole system network planning for gas with a focus on a 10+ year time horizon. This would be complementary to the operational planning and delivery activities which happen in a 0 to 10 year time horizon

within NGG (and other asset owners / operators), and provide clear strategic direction to industry participants for their own operational, business planning and regulatory processes.



We therefore agree with the principle of establishing a single body with responsibility for whole system strategic network planning including gas, however, we disagree with some of the detail of the proposal outlined in Option 1 as this would result in operational (rather than strategic) network planning and delivery activities being undertaken within an FSO (see details of high level impacts in the diagram above). We believe this would detract from creating an FSO with a clear focus on undertaking strategic, whole system planning activities.

There is a significant risk associated with separating accountability for the planning and design of a safe, efficient and economic network from establishing the needs of the network for investment or commercial management tools. Therefore, if implemented as proposed, Option 1 would result in the need for specific activities and capabilities (undertaking network capability assessments, needs case production, optioneering, economic options assessments) to be duplicated across an FSO and NGG. These activities would need to continue to be undertaken by NGG in any future model as they directly inform and underpin the development of our regulatory business plan submissions.

The proposals set out in Option 1 would also require an FSO to work very closely with the industry including NGG to ensure that safety, planning standards, network/asset modelling, customer requirements, operational constraints, planning assumptions etc. are all shared and understood in order to ensure that no unintended inefficiencies are embedded as part of the overall planning and assessment processes.

Long-Term and Medium-Term Forecasting

We support the proposal outlined in Option 1 for an FSO to undertake medium- and long-term forecasting of supply and demand for the whole energy system.¹ In performing this role it is essential that an FSO is balanced and equitable in its engagement and view of the whole energy system forecast process and outcome, including electricity, gas and hydrogen. This will ensure that robust, defensible and economic proposals are brought forward that offer the best mix of energy solutions to achieve net zero at the most efficient cost to consumers, whilst also safeguarding security of supply.

We note, and agree with, the proposal that NGG would remain accountable for producing the Gas Summer and Winter outlook and review publications, the basis of which would be informed directly by the energy forecasts provided by an FSO.

¹ For clarity, NGG does not currently undertake this activity and has no capability to produce medium- or long-term energy forecasts. Instead, the ESO currently completes this activity on behalf of NGG via a General Service Agreement (GSA), with the forecasts being the outcome of the annual ESO FES processes.

Market Strategy

We support the proposal outlined in Option 1 and agree that an FSO should take a leading role in developing whole system market strategy. Specifically for gas, this could initially involve an FSO taking a lead role in chairing the Future of Gas Steering Group (FoG) along with producing and publishing the associated Gas Markets Plan (GMaP) which we would expect to evolve and grow to meet the volume of change that will be necessary as the industry decarbonises. We would expect an FSO to lead on developing and implementing industry fora and associated publications to drive whole system market reform in support of net zero. As such, whilst FoG and GMaP may initially transfer to an FSO, we expect these to be superseded as whole system arrangements are developed to drive strategic market reform. Whilst accountability for this activity could transfer to an FSO, NGG would need to continue to participate in such discussions as a market participant, resulting in a requirement for duplication of capability between an FSO and NGG.

Network Emergency Coordinator (NEC)

There are several important factors that require consideration when making the decisions about whether or not the NEC role should be undertaken by an FSO such as the ability of an FSO to recruit and retain individuals with the competence required to enact the role. Further detail is provided in Annex 1.

10. Do you agree that there is not currently a case for the FSO to undertake all GSO roles and functions, including real-time gas system operation, as outlined in Option 2? If you do not agree, please explain why.

We agree that there is no case for an FSO to undertake all GSO roles and functions, including real-time gas system operation, as outlined in Option 2. We welcome the recognition that retaining an integrated Transmission System Operator (TSO) model for gas is critical from a safety and security of supply perspective.

The primary objective of the GSO function is to safeguard elements of GB gas security of supply, ensuring societal energy needs are met in real-time. This objective is achieved through the safe, efficient, and economic operation of the Gas National Transmission System (NTS) assets.

Safe real-time operation of the NTS is achieved through: gas quality management, ensuring the composition of the gas transported through the network complies with legal requirements, and can be safely combusted by end consumers; and through pressure management, ensuring maximum and minimum system pressures are actively managed by physical network assets.

A safety case regime, discharged via an integrated Gas TSO (Transmission System Operator) model, is employed by the Health and Safety Executive under the Gas Safety (Management) Regulations to ensure the safe management of gas flow through a network, and imposes a duty on the TSO to minimise the risk of a gas supply emergency.

Pressures are actively managed by physical network assets (compressors, valves, pipelines) to prevent both over-pressurisation, which could lead to a localised process safety incident (e.g. an explosion and fire from a pipeline rupture); and under-pressurisation which could result in failure to maintain supplies to distribution networks and resulting loss of supply and safety issues.

Economic and efficient operation is also achieved through the use of physical assets to facilitate the national balancing regime, which reduces the need for the GSO to use commercial tools or market rules. Use of these physical assets requires close co-operation with field operations and asset management to secure availability and reliability to provide the flexibility required of the system by our customers. The physical nature of gas necessitates a deep and collaborative relationship between the Gas SO and TO, the efficacy of which is incentivised through a TSO TotEx (total expenditure) regulatory regime in which NGG sells the rights for access to the system with the incentive to efficiently invest, maximise capacity and minimise disruption to GB gas network customers as assessed by Ofgem.

Consequently, unlike NGESO, NGG undertakes the role of residual balancer, acting only when the market has failed to balance itself on a given day. The costs of the balancing actions taken by NGG in the market are

minimal when compared to those taken by the ESO (typical annual balancing costs of £0.03bn for GSO compared to over £1bn for the ESO).

11. Do you have views on the proposal for an advisory role? What organisations do you consider would benefit from the provision of advice by the FSO? Who should bear the costs of providing that advice?

An FSO could have an important role in advising Government and Ofgem on how to resolve uncertainty and whole system issues over the transition to a net zero energy system.

It is important that roles, responsibilities, accountabilities and interfaces are clearly defined between an FSO, DSOs, government, Ofgem, and other bodies (such as the Climate Change Committee and Energy Systems Catapult) to ensure no duplication of activity. This will likely require increased specification on an FSO's advisory role.

Ad hoc advice from an FSO to other bodies, such as planning authorities, could also be very valuable. However, it is important that it does not stretch resources required to deliver other functions. As such, the responsibilities for wider advice need to be properly resourced and costed with additional staff employed to carry out these activities.

In order to succeed in any advisory role an FSO will need to maintain and grow existing capabilities as well as bring in new ones across all vectors. These capabilities will not be easy to flex in scale, as the skillsets required are all relatively specialist and some (e.g. with regard to strategic network planning) are not generally required commercially and cannot be sourced easily (including through consultancies). As such, an FSO will need stability in its role, ideally defined in legislation.

This type of advisory role could be funded through multiple routes, with funding options dependent on the organisational model and the scope of the advice provided.

As with any new and enhanced roles, there will be a need to ensure that an FSO has the required skills, capabilities and capacity in place ahead of roles commencing.

12. Do you have any views on the other areas where we are considering new and enhanced roles and functions for the FSO (outlined in section 3.2)?

In principle we support the consideration of the new and enhanced roles and functions for an FSO as outlined in the consultation. We recognise that many of the areas subject to consideration are dependent on the outcome of other consultations, workstreams or decisions on decarbonisation pathways, and we will respond as appropriate to any further consultations² across relevant policy areas.

On the areas being considered for new and enhanced roles and functions:

- **Advisory role:** Please see our response to question 11 above.
- **Dispute resolution:** There is a risk that dispute resolution could detract from the primarily strategic nature of an FSO. Therefore, we do not support the inclusion of this role without further clarity on the potential benefits of the proposal for a transfer of this activity from Ofgem to an FSO. We agree that streamlining and clearly defining the roles between Ofgem and an FSO will be important.
- **System planning and network development:** Whole system coordination and strategic long-term network planning is a key gap in today's governance structure. Strategic network planning should be defined as setting the direction and vision for how future energy infrastructure supports the transition to net zero at a national and regional level. This should be based on industry consultation and whole energy system planning, with close collaboration between all network owners (electricity, gas, hydrogen, carbon) at both the distribution and transmission level. We see the benefit in an FSO undertaking long-term strategic whole system planning, providing analysis, advice and recommendations and fostering this coordination and collaboration. This will support Ofgem in its role as the economic regulator in undertaking its assessment of business plans developed by asset owners, enabling them to take decisions approving investment through scrutinising the economic elements of the investment (i.e. cost)

² This includes current consultations on the Design and Delivery of the Energy Code Reform (BEIS; Ofgem), Competition in onshore electricity networks (BEIS) and Early competition in onshore electricity transmission (Ofgem).

without revisiting the need case for system investment. Conversely, we would expect an FSO's advice on existing network assets to be limited to where decommissioning or upgraded capacity is considered, with Ofgem assessing the evidence of the need for and then cost of maintenance and refurbishment.

Clear definitions of the roles between an FSO and asset owners will be important here to ensure that responsibilities and risk are appropriately allocated between an FSO and network owners. Network owners will remain best placed to undertake engineering feasibility studies, system optioneering, programme and supply chain management and to develop and deliver against approved business plans to ensure timely, efficient delivery of the infrastructure investment required to reach net zero. This will necessitate the duplication of some capabilities and capacity between an FSO and relevant asset owners, though duplication can be minimised with efficient allocation of accountabilities.

We will respond to Ofgem's electricity transmission network planning review consultation with further detail on this area.

- **Driving competition in energy networks:** We agree that an FSO could be well placed to take on the role of developing and implementing competition where there is a benefit to consumers, and will also be responding to the competition consultations currently underway by both BEIS and Ofgem.
- **Energy market design:** We agree that an FSO could play a greater role in energy market design, however we welcome further consideration of the division of responsibilities between BEIS, Ofgem, and a potential FSO for driving energy market design forward.
- **Coordination with distribution networks:** In order to take a whole system view we agree that increased coordination and collaboration with both gas and electricity distribution networks will likely be required. We believe duplication between potential FSO and DSOs should be avoided where possible and that the interaction between them should be carefully defined, and we welcome further consideration of this as the FSO role is defined.
- **Heat and transport decarbonisation:** We believe this area needs further review on the exact roles and responsibilities of a potential FSO versus BEIS, Ofgem, industry, DSOs, and local authorities. The scope of work required for heat and transport decarbonisation is large, ranging from local skills planning and consumer engagement, to infrastructure investment decisions at a national and local level. This area is likely to require input from multiple areas across government, Ofgem, the industry, and consumers. It will be important to ensure that an FSO is given a manageable remit to ensure success.
- **Data:** Subject to further consultations, we agree that enhanced roles in data could sit with an FSO.
- **Future system operability, engineering standards and energy code development:** We will separately be responding to the Design and Delivery of the Energy Code Reform consultation.
- **Hydrogen and CCUS:** We welcome recognition of the important role that an FSO could have in supporting the growth of new technologies and markets, including hydrogen and CCUS. Given the UK's ambition to support the growth of hydrogen networks at pace it will be important that an FSO builds further capability to understand hydrogen rapidly and is able to include the significant potential role of hydrogen as part of its whole system strategic planning. Again, both Hydrogen and CCUS are subject to further separate consultations.

Across all the recommended enhanced or new roles for an FSO it is important that roles, responsibilities, and accountabilities are carefully considered and clearly defined between an FSO, government, Ofgem, any other government bodies, and industry. As noted above, the additional roles considered will require expansion of the ESO's current capabilities and duplication of some GSO and potentially gas and electricity TO capabilities. For any new and enhanced roles, there will be a need to ensure that an FSO has the required skills, capabilities and capacity in place across all relevant vectors ahead of roles commencing to minimise risk of implementation and ensure progress at pace. Throughout there will be a need to ensure that development of the long-term whole system strategic planning function is prioritised and that additional roles do not detract from an FSO's ability or capacity to fill this key gap in current accountabilities.

Organisational models

13. What are your views on our proposed characteristics and attributes of a future system operator and how the models presented would deliver against them? Are there other characteristics or attributes that we have not yet considered?

We agree with the proposed characteristics and attributes of an FSO as outlined in the consultation. Either organisation model, supported by effective structural frameworks and risk mitigation, could deliver against these characteristics and attributes.

We believe it will be particularly important to establish an FSO that has technical experts with skills, knowledge and capabilities across all energy vectors working within an organisation with a forward-looking and strategic culture. This should be considered in further detail when designing an FSO entity, determining roles and responsibilities, and in assessing how to build additional capability.

14. Are we considering the right organisation models for the FSO? And why?

Given the policy goals set out, we agree that the right organisational models are being considered and believe that both are viable options. There would be no value in further consideration of mixed public/private models as these would not add any significant benefit over the models considered, and governance requirements for a system operator under a not-for-profit model would be a substantial challenge. Below we set out the issues that would need to be considered under the two models proposed.

For the option of a 'standalone privately owned model, independent of energy sector interests', there is a question over the possibility of removing all potential for conflicts of interest, therefore ensuring effective mitigation of conflicts from the financial return model applied would be important. Ensuring the right incentivisation would also be critical. For example, if an FSO were to undertake day-to-day balancing, there is a risk that the incentives associated with this result in it being too focused on these short-term activities at the expense of time and focus on the long-term strategic planning, which we believe is the key gap in today's structure. Consideration would therefore need to be given to how to balance incentives or targets for short-term operations and long-term strategic planning in order to incentivise decisions and actions which drive least whole system costs in delivering net zero. Finally, thought would need to be given to ensuring the right regulatory model. It is possible that under private ownership Ofgem's remit may need to be larger than if an FSO were to be public (e.g. in regulating both the cost of an FSO itself, managing its goals and framework in an evolving context, and the recommendations of an FSO) which will require it to have greater capacity in order to effectively support the investment decisions required at pace and scale.

For the option of 'a highly independent corporate body model, classified within the public sector, but with operational independence from government' we agree with the considerations raised in the consultation that: incentivising is less clear in this model, and that they would likely not be used to drive organisational performance; this is likely to be simpler and quicker to implement as there will not be a need to find a suitable buyer first with appropriate clarity on incentives and financial model in order to invest. In relation to its governance by Ofgem, the model helps to create clarity of accountability and responsibility between bodies and may be more suited to facilitating a holistic, strategic focus on the policy goals and requirements for the UK's net zero transition. However, under this model it is also important to consider the risks associated with the need to attract and retain technically expert talent which would need to be mitigated (for example through exploring models for flexibility in public sector pay frameworks).

Each option therefore carries its own balance of different pros and cons which will need to be mitigated effectively in order to ensure a smooth transition. We believe therefore that early clarity from BEIS on its preferred model will be important in order to allow these considerations to be thought through in more detail.

15. Are we considering the right elements for the FSO's regulatory and accountability frameworks? And why?

We agree with the elements being considered for an FSO's regulatory and accountability frameworks, particularly that:

- The functions, powers and duties of an FSO should be set out in legislation to ensure it is appropriately empowered
- Ofgem will be responsible for the regulation of the entity's cost, cost recovery model, incentives, and licences, with such responsibility varying depending on the organisational model ultimately adopted (see further below)

- A Strategic Policy Statement could help align an FSO's and Ofgem's objectives to the Government's policy direction
- Further consideration should be given to ensure effective incentivisation of an FSO's real-time electricity balancing actions (included in the proposed function), to prevent any conflicts or tension between short term and long-term objectives and to achieve the right risk / reward balance for consumers.
- We believe that the remit of Ofgem would differ between the two organisational models being considered, particularly with regard to regulation of the decisions and recommendations of an FSO where we would expect Ofgem's regulation to be more limited under a public sector model. Under either model it will be important to have clarity on roles and responsibilities to ensure efficiency of decision making and effective, timely delivery of net zero for the benefits of consumers. Please see our response to question 12 (system planning and network development) above for further information.

16. Do you have views on the level of shareholding or control involving other 'energy interests' and the FSO at which a conflict of interest would become a concern?

Any organisation with significant energy interests in the UK could be, or be perceived to be, in a position to benefit from certain FSO recommendations or decisions. An FSO would have the ability to directly influence energy market movements, and thus market participants' costs or revenues, through thousands of small, hard to scrutinise decisions.

Given this high risk of potential conflict of interest³, the current situation, where SO owners are unable to participate in energy market activities, should be maintained. Continuation of these unbundling requirements will also be required to comply with the Trade and Cooperation Agreement with the EU.

We recognise the importance of ensuring an FSO is free from real or perceived conflicts of interest and note that the consultation states that board membership by those conflicted by energy sector interests would not be compatible with the required level of independence. Given the nature of an FSO's roles and responsibilities (as proposed) there will be a need for it to have a board with the appropriate experience to guide an FSO in energy system matters. Best practice from other parts of industry could be looked at to ensure appropriate transparency of board members interests (for example Ofgem publishes a register of interest for senior officials including GEMA members).

17. Are we considering the right implications of our proposals for Elexon and Xoserve?

For Elexon, we agree that you are considering the right implications e.g., on ensuring Elexon retains its operational independence and remains appropriately accountable to the industry it serves. For Xoserve we agree that at present there is no compelling reason to change the ownership structure or key functions. We support further engagement with Elexon and Xoserve to better understand the detail.

We note that the role and functions of Xoserve and Elexon are being considered as part of the Consultation on the Design and Delivery of the Energy Code Reform which we are responding to in parallel with this consultation.

Implementation

18. What is your view on the preferred implementation approach? Please explain why.

We welcome the recognition in the consultation that NGESO and NGG are currently owned by National Grid plc and that any change in ownership of all or part of the capabilities of these organisations will require a sales process and for National Grid to be involved in the overarching implementation.

³ As recognised by the consultation, there are high levels of checks and balances under the existing system operation ownership model which have ensured that no perceived or real conflicts of interest have been acted upon.

We are committed to continued support of BEIS' policy goals, and to collaboration with BEIS and Ofgem to ensure disruption during any transition is minimised.

Once the outcome of the consultation is known we will be working closely with BEIS and Ofgem to develop an implementation plan on the process for transferring existing capabilities and building additional capabilities and to ensure that an FSO has the required skills, capabilities and capacity in place at the relevant levels of its organisation, across all vectors and across relevant parts of the energy system ahead of new or enhanced roles commencing. This may include some duplication of capability between an FSO and the existing asset owners.

We will do this consistent with our responsibilities to consumers, our regulatory duties, the interests of our employees, and our responsibilities to our shareholders.

19. Based on the areas where we are considering new and enhanced roles and functions for the FSO, which of these should be prioritised for development? Please explain why.

There may be merit in convening a group of industry leaders, representative of the diverse range of interests, to provide advice to BEIS on the detail of the roles and responsibilities of an FSO to ensure timely delivery of net zero, including advising on which of the new and enhanced functions should be prioritised for development.

We believe that roles and functions which support effective and timely strategic whole energy system planning should be prioritised. This will help manage uncertainty and drive timely investment to ensure progress towards net zero. At present this is particularly urgent for the electricity system where there are imminent targets for increased electrification and for decarbonisation (e.g., 2030 target for 40GW offshore wind) and is becoming increasingly pressing for the gas sector where decisions on natural gas, CCUS and hydrogen will be required in the coming years.

20. What do you believe are the risks to implementation? How can these be mitigated?

Implementing a system change of this significance has the potential to create both operational disruptions (e.g. to effective system operation and resultant energy provision) as well as strategic risks (such as flight of talent if not managed correctly). These risks would be exacerbated if there were delays to an implementation process, for example due to lengthened legislative timescales and/or sales process, which then risk introducing ambiguity and uncertainty into this systemic shift, and increasing costs for delivery of change.

Other risks could arise through the implementation phase due to inadequate design of an FSO, which could blunt its effectiveness and its ability to meet its proposed responsibilities. For example, in the design of an FSO it would be important to ensure that the right capabilities are in place ahead of giving it new, or enhanced, responsibilities; and it would be important to design appropriate reward and pay frameworks to retain existing capabilities. Under Option 1 for gas and under the system development and network planning function for all vectors there would need to be some duplication of capability between an FSO and the existing asset owners. Recruiting and developing this capability whilst ensuring both an FSO and existing industry participants (including NGG) are able to safely operate and discharge their obligations will require both time and planning to execute.

In addition, when designing the regulatory framework and potential incentivisation scheme it will be important to ensure that there are no potential conflicts of interest within an FSO when enhancing the whole system strategic planning responsibilities if also giving it responsibility for the day-to-day electricity system balancing. Other risks will need to be addressed in planning for a smooth separation of IT systems, ensuring system continuity and security during this transition, any failure in this regard could have damaging long term consequences for the whole UK energy system.

As already said, once the outcome of the consultation is known we are committed to working with BEIS and Ofgem to design, develop, and implement a transition programme that manages any implementation in a coordinated and efficient way to minimise both transition and 'end-state' risk. We envisage this will include creating new processes, data flows and information exchanges in addition to comprehensive recruitment and capability build.

21. Do you have any comments on potential implications of implementation for you, your organisation, or other stakeholders?

The consultation rightly recognises that many of the assets and functions that would form an FSO under the proposals are currently owned by National Grid, requiring a sale process to take place. Funding for the establishment of an FSO is also an important consideration. Therefore, any implementation of the proposals would have significant implications for our employees, customers, and shareholders. Once a decision on the future governance arrangements is taken by Government, it is therefore important that National Grid, BEIS and Ofgem work collaboratively to design, develop, and implement a transition programme that reduces uncertainty for our employees, customers, and shareholders and manages any divestment fairly, and in a coordinated and efficient way to minimise risk. This should include work to ensure an FSO has the appropriate skills, capability, leadership, culture and governance to deliver a balanced focus on all energy vectors, not just electricity.

It will be necessary for clarity around the funding proposals to be made in good time to allow for orderly transition planning.

Impact Assessment

22. What is your view on the position there are likely to be cost savings across the energy system from an increased “whole system” view, as described in paragraphs 47-52 of the IA? If so, is the potential magnitude of savings illustrated fairly in the IA? If not, why not?

We agree that there are likely to be cost savings across the energy system from an increased whole system view. Whole system strategic planning, across energy vectors, will drive cost savings through planning optimised system developments in a timely way.

The key financial benefit of the creation of an independent FSO will be to increase confidence in the use of technical analysis to overcome uncertainty and to better plan for the future through whole systems analysis. This is likely to result in lower network costs due to use of more effective longer-term solutions, which will in turn allow easier system integration of lower cost renewables and a more efficient wholesale market. The benefits of this approach could potentially be greater than those outlined in the Impact Assessment as the current system, with its slow decision making, can be very inefficient and result in late investment.

However, we have not contributed to the Impact Assessment which underpins the proposals, and we do not agree with the methodology or the cost savings identified. For example, the cost savings associated with the removal of the potential for the SO to overestimate network transmission needs assumes that potential or perceived conflicts of interest have materialised. However, the consultation and Impact Assessment both repeatedly recognise that there is no evidence of such a conflict being acted upon.

Alongside costs it is also important to consider the safety and security of supply impacts of any proposals. Please see our response to questions 9 and 10 above for our concerns related to the implementation of some of the proposals.

23. What is your view on the conclusion that policy intervention is likely to increase the benefits of onshore electricity network competition, as described in paragraphs 53-59 of the IA? If you agree, is the potential magnitude of savings illustrated fairly in the IA? If not, why not?

We agree with the potential for benefits, however it is also important to note that there can also be benefits to an FSO, without the perception of conflicts of interest, being able to recommend against using competition where the savings from competition are expected to be smaller than the benefits, e.g. due to the slower build of network assets due to the time required for a competitive process.

We agree that there could be some savings from removing perceived conflicts of interest between NGESO and NGET as it could enable greater confidence in the tender procurement decisions to enable solutions to be

selected that provide the most benefits to consumers. However, we do not agree with the magnitude of savings that is suggested to be between 25-50%. We welcome additional clarity on the analysis undertaken to arrive at this estimate.

We have submitted a response to Ofgem's consultation on Early Competition in onshore electricity transmission networks and will be responding to BEIS' consultation on competition on onshore electricity networks in due course.

24. Do you think that the impact assessment has identified and considered the key costs and benefits of policy intervention? If not, can you provide details on other impacts that have not been considered?

We have not contributed to the Impact Assessment which underpins the proposals, and we do not agree with the methodology or the findings. It is important that all costs incurred by National Grid plc and any independent FSO, both through the transition phase and end state, including stranded costs and dis-synergies, are fully identified and considered.

With regards to key costs, we are concerned that the analysis has been carried out using flawed assumptions, such as the incorrect primary cost drivers. Therefore, the cost assumptions for fully separating the ESO from National Grid, which were based on the costs of legal separation not ownership separation, fail to fully reflect the cost drivers and will need to be significantly changed. A fundamental flaw is the assumption that the primary cost driver is process and licence separation rather than other costs, including but not limited to IT, Shared Services and pensions, and that the majority of costs of separating the ESO have already been incurred. Full agreement on costs will be necessary in order for the proposals to progress, we therefore look forward to continued discussion with BEIS and Ofgem on this important area and would welcome the opportunity to contribute to any future cost assessment or analysis.

25. Do you think that the distribution of impacts is fairly represented, with impacted groups correctly identified? Outlined in table 5 of the IA.

We broadly agree with the distribution of impacts represented in Table 5. We note that the assumptions on cost recovery timings are assumptions for the purpose of modelling, not policy positions, and look forward to working with BEIS and Ofgem to define these timings.

26. We invite respondents' views on whether the proposals for energy system governance reform may have a different impact on people who have a protected characteristic (age, disability, gender re-assignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex or sexual orientation), in different ways from people who don't have that characteristic. Please provide any evidence that may be useful to assist with our analysis of policy impacts.

We support the consideration of this question across consultations on energy system governance and the establishment of an FSO. It will be important to consider this for both the employees of an FSO and for consumers and society for which the energy transition to net zero may have a differing impact for people with protected characteristics.

As part of the review of roles and responsibilities across energy governance institutions, we believe it will be important to ensure that responsibilities include considerations of impact on all consumers, including those with protected characteristics, is properly considered when making choices on the future energy system (e.g. in terms of access, cost, and ease of new technology systems that consumers are incentivised to transition to).

Annex 1

Additional information (question 9): The Network Emergency Coordinator (NEC)

The Network Emergency Co-ordinator (NEC) is responsible for co-ordinating actions across the affected parts of the network to prevent as far as possible, a gas supply emergency developing, and where it cannot be prevented, to take timely decisions in order to minimise the safety consequences.

To fulfil this responsibility the NEC has established arrangements for co-ordinating the actions of duty holders, including conveyors operating on the affected part of the network.

The requirements of the role are defined within the Gas Safety Management Regulations, (GSMR), and associated NEC Safety Case. Any change in the NEC duty holder would therefore require the successor to prepare, submit and have a Safety Case accepted by the Health and Safety Executive, ("HSE"). The key demonstration for any material change is that the new submission does not degrade the existing safety controls.

The day to day management of the NEC Safety Case, industry procedures and awareness, and delivery of an annual exercise programme is delivered by the Office of the NEC, a small team within the current Gas System Operator (GSO) which also provides incident response support and training to GSO. Elements of this function must stay within the same organisation as the NEC, and if it were proposed to move the NEC to an FSO, a discussion would need to take place to ensure clear accountability for different aspects of the emergency arrangements.

Part of these arrangements entails having NEC Officers in place, to provide 24/7 cover for the role if the NEC is not available. The NEC Officers must have the same competence as the NEC and as such, consideration must be given to how this degree of cover could be provided if the role of the NEC moved to an FSO.

The parties who have a duty of co-operation with the NEC are far broader than gas transporters (as indicated in an FSO consultation) and include parties such as shippers, producers of gas, storage and interconnector operators. There is currently no requirement for any party in the electricity industry to co-operate with the NEC.

While the role of the NEC has always been undertaken by National Grid Gas (NGG) and its predecessors, GS(M)R states that an NEC can relinquish his role by giving at least 6 months' notice. The 6-month notice period is designed to allow gas transporters on the network to agree a replacement NEC, and for that successor to prepare, submit and have a safety case accepted by the HSE.

To ensure any future duty holder has the capability to effectively execute the role, it is imperative that the NEC has access to real time operational information about the gas networks in order to inform any decision making. This information is currently provided by the GSO, and as the NEC is an NGG employee there are no barriers to this information. Should the NEC become an FSO employee the appropriate mechanisms would need to be in place to ensure availability of operational information. Additionally, competence of the duty holder would need to be ensured, requiring the creation of a competent authority to appoint the NEC with arrangements in place to ensure that the NEC has the requisite experience in the gas industry and the means to remain aware and up to date with current operational challenges.

NGG believe that simply transferring the NEC role to an FSO would not improve the management and coordination of whole system energy emergencies if the existing legal framework is maintained. The NEC is obligated through the GSMR and subsequent NEC Safety Case to protect the gas network(s) from the public safety risk associated with the loss of gas pressure. This could result in significant impacts to electricity generation and heavy industry.

There is potential benefit from supplementing the existing NEC arrangements with a coordinating authority across the whole energy system. Such a coordinating body would require the requisite changes made to the existing legislative and regulatory frameworks. The design and requirements of such a role are being explored through the Energy Emergencies Executive Committee, (E3C) project to Review the Impact of a Gas Supply Shortage on the Electricity Network, (RIGSSE). Such a role could reside in an FSO in the future.

Finally, it should be noted that no one within NGG is employed as an NEC or NEC Officer, these are instead duties held in addition to the individual's substantive role. Therefore, should a decision be taken to move

responsibility for the role of the NEC to an FSO, the FSO would have to recruit to fill the NEC / NEC Officer roles.